

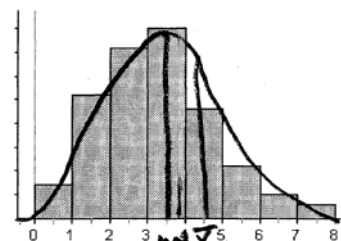
NAME: _____

Ch. 3 Review

FREE RESPONSE:

- 1) Looking at the following graphs, draw in the density curve and mark where you would estimate the mean and median would be. Write approximate the mean, median, and shape of the graph.

Graph 1

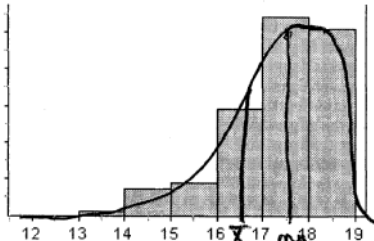


Mean = 4.5

Median = 3.5

Shape = Skewed Right

Graph 2

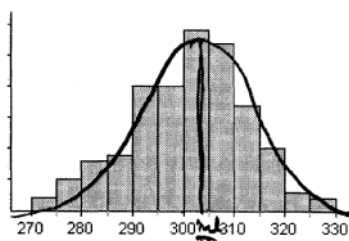


Mean = 16.5

Median = 17.5

Shape = Skewed Left

Graph 3



Mean = 304

Median = 304

Shape = Symmetric

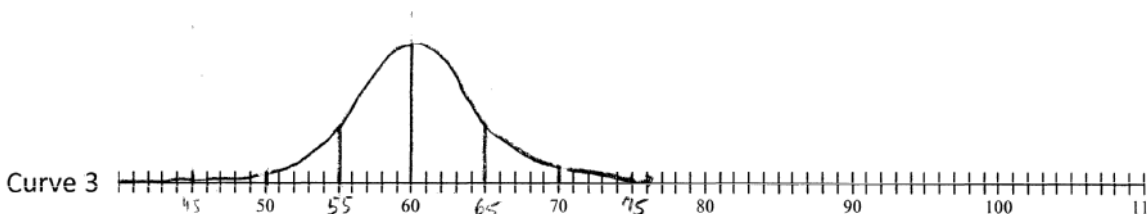
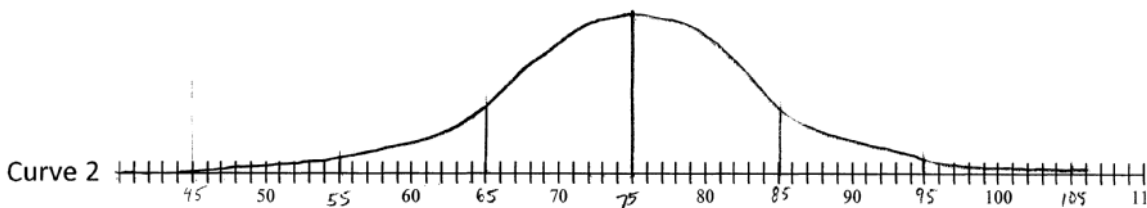
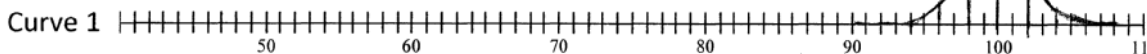
- 2) All normal curves have symmetric & unimodal shape

- 3) Sketch the following normal curves on the number lines below:

Curve 1: $\bar{x} = 100$, $s = 2$

Curve 2: $\bar{x} = 75$, $s = 10$

Curve 3: $\bar{x} = 60$, $s = 5$



- 4) Male and female professional basketball players have very different average scoring statistics. Per game, men average 28 points with a standard deviation of 5 points. Per game, women average 18 points with a standard deviation of 3 points. Larry and Stacy are both basketball players. In their last games, Larry scored 37 points and Stacy scored 32. Who was actually the better scorer? Justify your answer.

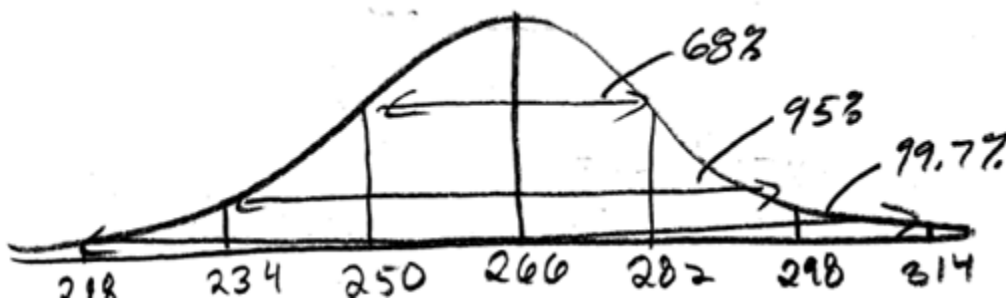
$$z_L = \frac{37 - 28}{5} = +1.8 \quad z_S = \frac{32 - 18}{3} = +4.667$$

Stacy did better since she scored more than 4 standard deviations above the mean for women while Larry only scored 1.8 standard deviations above the mean for men.

- 5) The distribution of pregnancy lengths from conception to birth for humans is normally distributed with a mean of 266 days and a standard deviation of 16 days.

- a. Sketch a picture of the distribution below. Label all standard deviations.

$N(266, 16)$



- b. What z-score does a pregnancy of 257 days have?

$$z = \frac{257 - 266}{16} = -0.563$$

- c. A z-score of 2.8 corresponds to what pregnancy length?

$$2.8 = \frac{x - 266}{16}; \quad x = 310.8 \text{ days}$$

- d. What percent of humans have a pregnancy lasting less than 257 days?

$$P(x < 257) = 28.69\%$$

- e. What percent of humans have a pregnancy lasting longer than 280 days?

$$P(x > 280) = 19.08\%$$

- f. What percent of humans have a pregnancy lasting between 260 and 270 days?

$$P(260 < x < 270) = 24.49\%$$

- g. How long would a pregnancy have to last to be in the longest 10% of all pregnancies?

$$P(X > A) = 10\% \quad \text{OR} \quad P(X < A) = 90\%$$

$$\text{invNorm}(0.90, 266, 16)$$

$$A = 286.5 \text{ days}$$

- h. How short would a pregnancy be to be in the shortest 25% of all pregnancies?

$$P(X < B) = 25\%$$

$$\text{invNorm}(0.25, 266, 16)$$

$$B = 255.2 \text{ days}$$

- i. How long would a pregnancy be to be in the middle 20% of all pregnancies?

$$P(X < A) = 40\%$$

$$\text{invNorm}(0.40, 266, 16)$$

$$A = 261.9 \text{ days}$$

$$P(X < B) = 60\%$$

$$\text{invNorm}(0.60, 266, 16)$$

$$B = 270.1 \text{ days}$$

Between 261.9 and 270.1 days

- j. What percentile is a pregnancy of 258 days?

$$P(x < 258) = 30.85\%$$

31st Percentile

- k. What percentile is a pregnancy of 298 days?

$$P(x < 298) = 97.72\%$$

98th Percentile

- l. What pregnancy length corresponds to the 3rd quartile?

$$P(X < Q_3) = 75\%$$

$$\text{invNorm}(0.75, 266, 16)$$

$$Q_3 = 276.8 \text{ days}$$

- m. Find the IQR.

$$P(X < Q_1) = 25\%$$

$$\text{invNorm}(0.25, 266, 16)$$

$$Q_1 = 255.2 \text{ days}$$

$$P(X < Q_3) = 75\%$$

$$\text{invNorm}(0.75, 266, 16)$$

$$Q_3 = 276.8 \text{ days}$$

$$\text{IQR} = 276.8 - 255.2 = 21.6 \text{ days}$$

- n. Mr. Wheelers' wife's first pregnancy was in the 55th percentile. What does this mean?

The length of Mrs. Wheelers' first pregnancy was 55% longer or the same as all pregnancies.

- o. How long was Mrs. Wheelers' pregnancy?

$$P(x < A) = 55\%$$

$$A = 268.0 \text{ days}$$

- 6) What would be the mean of a Normal distribution with a standard deviation of 8 in which 43% of the distribution is less than 84?

$$z = \text{invNorm}(0.43) = -0.176$$

$$-0.176 = \frac{84 - \mu}{8} \quad \mu = 85.408$$

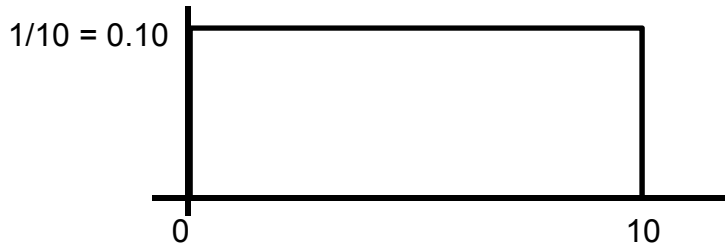
- 7) What would be the standard deviation of a Normal distribution with a mean of 24 in which 67% of the distribution is more than 17.5?

$$z = \text{invNorm}(0.33) = -0.440$$

$$-0.440 = \frac{17.5 - 24}{\sigma} \quad \sigma = 14.77$$

- 8) Given a uniform density curve with the interval 0 to 10.

- a. Draw the uniform density curve with the appropriate height shown.



- b. What is the mean? What is the median?

$$\text{Mean} = \text{Median} = 5$$

- c. What percent of observations are below 2?

$$(2)(0.10) = 20\%$$

- d. What percent of observations are above 6.8?

$$(3.2)(0.10) = 32\%$$

- e. What percent of observations are between 4.8 and 7.1?

$$(7.1 - 4.8)(0.10) = 23\%$$

- 9) Given the table of summary statistics below, find the new summary statistics using each linear transformation.

	mean	st. dev.	Min	Q_1	med	Q_3	max	IQR	Range
Original	152	12.5	60	88	118	197	228	109	168
+ 26	178	12.5	86	114	144	223	254	109	168
$\times 9$	1368	112.5	540	792	1062	1773	2052	981	1512
$\times 3 - 84$	372	37.5	96	180	270	507	600	327	504
$\div 10 + 25$	40.2	1.25	31	33.8	36.8	44.7	47.8	10.9	16.8

Multiple Choice Answers

1. B
2. E
3. A
4. C
5. C
6. B
7. D
8. A
9. C
10. C
11. C
12. B
13. D
14. C
15. B
16. D
17. C
18. B